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AECL's New Look

As part of the striking new corporate image proudly displayed in this Annual Report, AECL has adapted its naming system to reflect more accurately its global leadership in advanced energy technology.

Effective immediately, the corporation will be known as AECL, or EACL in French. The legal name of Atomic Energy of Canada Limited, or Énergie atomique du Canada limitée in French, will be retained, however, until the legal requirements for the new shorter version are completed.

AECL will now be organized into AECL Research and AECL CANDU. AECL Research includes Chalk River Laboratories, in Chalk River, Ontario, and Whiteshell Laboratories, in Pinawa, Manitoba, as well as an office in Ottawa. AECL CANDU has offices at Sheridan Park in Mississauga, Ontario and in Montreal, Quebec. AECL also has offices in Argentina, Korea, the Netherlands, Romania, and the U.S.

Letter of Transmittal

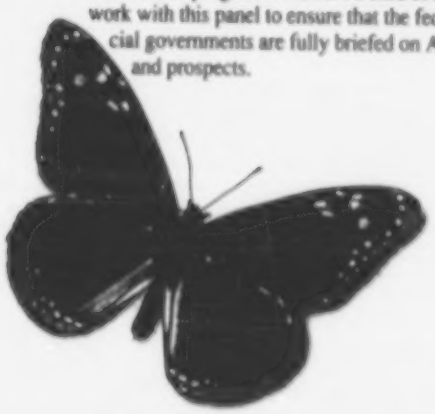
The Honourable Jake Epp
Minister of Energy, Mines
and Resources
House of Commons
Ottawa, Ontario

Dear Mr. Epp

It is my pleasure to submit the Annual Report of Atomic Energy of Canada Limited (AECL) for the fiscal year ended March 31, 1990, together with the corporation's financial statements and the report of the Auditor General. This submission is in accordance with subsection 150(1) of the Financial Administration Act.

The past fiscal year marked a turning point in AECL's history. After completing a comprehensive review of the Canadian nuclear industry, the federal government voiced its clear vote of confidence in AECL. Long-term funding is now assured for the company's research and development programs, and AECL has been asked to negotiate important new contracts for CANDU installations both in Canada and abroad.

With these emerging business opportunities on the horizon, we are pleased to report that our agenda for the coming year is full. One of our priorities will be to work closely with the newly established Research and Development Advisory Panel. As a peer review group, this expert panel will report to AECL on the appropriateness and scope of the corporation's R&D programs. AECL's Board of Directors will work with this panel to ensure that the federal and provincial governments are fully briefed on AECL activities and prospects.



During the year ahead, the corporation will continue to enhance its reputation as a leading supplier of advanced nuclear energy systems and related leading-edge technology. Our leadership, I believe, can be attributed to the tireless efforts of our Acting President and Chief Executive Officer, Dr. Stanley R. Hatcher. Special thanks should also be extended to my colleagues on the Board of Directors, a dynamic and dedicated group that has devoted a great deal of time to guiding the deliberations of our executives. Of course, tribute should be paid to the men and women of AECL, whose hard work and ingenuity have placed the company among the industry leaders.

We are entering this new fiscal year with considerable momentum and a renewed optimism in the future of nuclear power in Canada. We look forward to working with the corporation's shareholder to ensure that all Canadians continue to have access to clean, safe and economical energy. As always, your personal interest in AECL and your continued support are greatly appreciated.

Respectfully submitted,

Marnie Paikin

Marnie Paikin
Acting Chairman of the Board
AECL

President's Message

For the Canadian nuclear industry, 1989-90 was a watershed year in its 38-year history. Under the leadership of Energy, Mines and Resources Minister Jake Epp, the federal government completed a comprehensive industry review. This review led to the decision, announced on the eve of our year-end, to take initiatives to revitalize Canada's nuclear industry. The government's announcement represented a strong vote of confidence in the ability of the industry to deliver a clean, safe and economical source of energy to Canadians and countries around the world, well into the next century. Key to the decision was the commitment by Canada's nuclear utilities, led by Ontario Hydro, to bear a large share of the cost of nuclear R&D and to renew planning for new nuclear power station construction.

The momentum of the industry and the long-term funding of AECL's research and development programs are now assured. The message is clear: Canada will continue its role as a leading supplier of advanced nuclear energy technology and systems.

The message is clear: Canada will continue its role as a leading supplier of advanced nuclear energy technology systems.

Achieving Our Goals and Objectives

I am pleased to report that AECL met its key goals for the year, even within the constraints imposed by the government review. The company did report its first financial loss in 12 years, but these financial results were anticipated at the start of the year.

Our principal product, the CANDU reactor, continues to be a world leader in safety and operating performance. According to independent international evaluation, by the end of 1989 there were 339 large power reactors operating around the world, including 20 CANDUs, and on the basis of lifetime performance, four of the top 10 were CANDU systems. By year-end, one foreign and two domestic utilities had announced their intention to build more CANDU units.

Canada's national nuclear program began in the 1950s with a working partnership between AECL and Ontario Hydro. Today, that utility uses CANDU reactors to generate over half of Ontario's electricity. Ontario Hydro recently released its Demand/Supply Plan detailing the province's growing energy needs and its plans to meet them. Ontario Hydro is seeking approval for a preferred action plan that calls for at least 10 new reactors to be put in service over the next 25 years.

There are encouraging signs that other major CANDU projects will be negotiated in the coming year for completion in the mid-1990s. In addition to Ontario, New Brunswick is planning for more CANDU units. Internationally, Korea announced in 1989 its plan to build another CANDU at Wolsong and have it in service by June 1997. We look forward to concluding negotiations on this promising international opportunity.

A Vote of Confidence in AECL

Enhancing this optimistic outlook for CANDU was Mr. Epp's announcement on March 29, 1990. To revitalize AECL and determine its future direction well into the next century, the federal government has agreed to the following three key initiatives:

- the stabilization of AECL's R&D program funding at approximately the 1989-90 levels;
- the go-ahead for AECL to negotiate with New Brunswick to build Point Lepreau 2 as the prototype for the CANDU 3 reactor; and
- the authorization for the restructuring of AECL so that utility and private-sector investors can become equity partners in AECL CANDU. AECL would remain the majority shareholder on behalf of the federal government.

R&D Funding

As part of its commitment to research and development for the Canadian nuclear industry, the federal government will maintain its funding for the R&D program of AECL Research at about the same level as in 1989-90. This is $31.5 million a year above the level planned in the 1985 federal budget. The new funding level is set for the next seven years and is fully indexed against inflation.

A key factor in the funding decision was the commitment by Ontario Hydro, New Brunswick Power and Hydro-Québec to expand their support of our R&D programs. Ontario Hydro, which operates Canada's largest nuclear power program, has increased its funding support by $30 million a year for the next seven years, while New Brunswick Power and Hydro-Québec have also agreed to increase their funding for the same period. In total, utilities' support has increased by more than $35 million a year, protected against inflation. Clearly, these commitments of support from the major beneficiaries of AECL's R&D programs are integral to the viability of the national nuclear program. We can now plan a comprehensive R&D program with confidence in our future.

In addition to supporting the current operating reactors, we plan to increase the R&D effort on the advanced CANDU reactor. This thrust will ensure that Canadian utilities will have available the most up-to-date technology and that AECL is poised to take advantage of future opportunities as they arise. The funds will also allow us to address the urgent priority noted in last year's annual report – the need to replace aging equipment and refurbish or replace inadequate laboratory facilities.

We propose to establish a Research and Development Advisory Panel. This peer review group of eminent scientists and engineers from outside the company will be an independent voice, reporting to AECL's Board of Directors on the scope and appropriateness of our R&D programs. The panel will also ensure that federal and provincial governments are frequently updated on our research and development performance and requirements.

CANDU 3 at Point Lepreau

A major thrust of our current reactor design program is CANDU 3, an advanced 450-megawatt reactor, targeted initially for smaller Canadian utilities. Developed by our most experienced designers and engineers using state-of-the-art computer-aided design techniques and the latest nuclear technology, the CANDU 3 design is at least two years ahead of our competitors and has a promising potential for success in export markets. It is scheduled for design completion in 1992.

The federal government's authorization to negotiate with New Brunswick Power for the CANDU 3 prototype is key to the market launch of this second-generation reactor. The prototype could be on-line by 1996-97.

AECL Restructuring

Team work is essential to the growth and competitive success of Canada's nuclear industry, at home and abroad. It has become increasingly clear that progress depends on how well AECL, Ontario Hydro, the other utilities and the private sector can combine resources to optimize the CANDU success story in the national interest. For AECL CANDU, this partnering would expand the company's ability to operate in a more commercial manner by bolstering our international marketing and project management capabilities.

As a result of extensive discussions, the federal government has agreed that AECL should be given the ability to restructure so that it can share equity with other corporations. We intend to move forward and develop detailed restructuring plans for final approval by the Board of Directors and the federal government.

AECL's New Identity

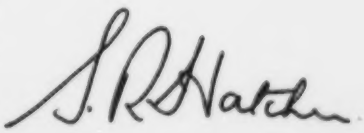
As we re-examine our industry, and rededicate ourselves to the challenges ahead, we have the ideal opportunity to review the corporation's visual image. I regard a good visual identity as fundamental to how we perceive our business and how we want others to see it. Therefore, we have developed a new and consistent corporate look that will be applied to our facilities, products and communications materials over the next 18 months. This annual report proudly displays our new identity, a corporate-wide statement that consistently reflects our global leadership in advanced energy technology.

AECL: Shaping the Future

Clearly, Canadian governments and utilities are recognizing the strategic importance of our industry, the excellence of our research and the environmentally responsible way we conduct our activities. After some years of uncertainty, our shareholder and customers have given us the tools to do the job. We are determined to justify that trust.

We recognize that the biggest single challenge facing the industry is building public awareness of the benefits of the nuclear energy option. As concern over the environment continues to rise on the public agenda, a growing number of Canadians view nuclear energy as a sound, realistic investment in the future.

On April 9, 1989, when I assumed on an acting basis the responsibilities of President and Chief Executive Officer, I brought to the task a firm confidence in this corporation's principal asset – its employees. Since then, that confidence has been strengthened daily. The people of AECL are dedicated, resourceful and innovative. Their efforts have brought our industry to this auspicious turning point, and I thank them on behalf of all Canadians.



Stanley R. Hatcher
Acting President and
Chief Executive Officer
AECL

AECL Research

To remain in the forefront of national and international nuclear development, AECL must continually consolidate its reputation in nuclear science and technology. To accomplish this goal, the corporation maintains world-class scientific staff at major laboratories at Chalk River, Ontario, and Pinawa, Manitoba, working on CANDU power reactor development and in areas that are complementary to this main thrust.

By contributing to the storehouse of human knowledge, AECL Research scientists and engineers earn membership in both the national and international scientific communities. AECL is part of an extensive scientific network noted for the rapid dissemination of new information and for its participation in exciting new collaborative projects. The value of this strategy was demonstrated quite dramatically by two major events in 1989.

AECL Research scientists are confident that, when all the facts are presented, the Environmental Assessment Panel and the public will agree that the technology does exist to dispose of nuclear fuel wastes in a manner that isolates used fuel safely from our environment.

The reported discovery, in the United States, of a cold fusion process with energy-production significance created worldwide interest and controversy. Researchers within the corporation, with their broad contacts, were able not only to keep Canadians up-to-date on the rapid unfolding of this story, but also to contribute, through experiments initiated within our laboratories, to the scientific consensus that emerged: namely, that it was unlikely that a "cold fusion" process with significant energy-production capability had been identified.

Our scientists and engineers also played a key role in formulating the proposal for the Sudbury Neutrino Observatory project in the areas of conceptual design work, water purification research, radiation measurements and project management. The purpose of this international project is to settle a long-standing controversy over the basic energy-generating processes in the sun, and to determine the fundamental particle properties of neutrinos. Canada is in a uniquely favorable position to execute the project, since it has a site in a suitably deep mine (Inco's Creighton Mine in Sudbury) and an available supply, on loan from AECL, of the 1,000 tonnes of heavy water needed to carry out the experiment. Full Canadian funding for this international project was authorized by the Minister of State for Science and Technology in January 1990.

Waste Management

For the past 12 years, AECL Research has been developing, in collaboration with Ontario Hydro and with international support, a concept for the permanent disposal of used nuclear fuel in Canada. A guiding principle has been that the system would not require continuous care by future generations. The concept is based on the disposal of used fuel in the stable rock formations of the Canadian Shield. A system of multiple barriers – consisting of a durable waste form, a corrosion resistant container, sealing materials and the massive rock formation itself – would isolate the nuclear fuel waste and ensure negligible impact on people and the environment, now and well into the distant future.

Peggy C. Beaulieu
Research Technologist,
Chalk River
Laboratories

In October 1989, the Federal Environment Minister, acting on the request of the Minister of Energy, Mines and Resources, announced the appointment of a seven-member Environmental Assessment Panel to review the concept developed by AECL for nuclear waste disposal in Canada. The review will be conducted in accordance with the requirements of the federal Environmental Assessment and Review Process (EARP). The panel will hold hearings in Ontario, Quebec and New Brunswick and may extend these to other interested provinces.

AECL welcomes the review process and is looking forward to the opportunity to discuss the wealth of information and technical data it has gathered on the proposed concept. AECL scientists are confident that, when all the facts are presented, the panel and the public will agree that the technology does exist to dispose of nuclear fuel wastes in a manner that isolates them safely from our environment.

AECL has always been aware of its responsibility for the environment.

Art Holloway
Geophysicist,
Applied Geo-
science Branch,
Whiteshell
Laboratories

Safety R & D

A multi-channel thermalhydraulic test facility, called RD-14M, has been commissioned at our Whiteshell Laboratories. This facility is designed to provide experimental data on the behavior of the heat-transport system circuit and components in CANDU reactors under postulated accident conditions. Following the successful completion of low-power natural circulation tests in RD-14M, high-power tests were conducted to collect information on primary flow behavior. The results have provided a valuable database against which computer predictions can be verified.

A visually transparent model of the CANDU heat transport system flow distribution header was constructed and installed in a new test facility at Whiteshell. The air-water tests proposed for this facility will help verify the two-phase flow phenomena inferred from other experiments and from predictions of Loss of Coolant Accident (LOCA) analysis codes. Preliminary tests have confirmed many aspects of the expected two-phase flow behavior.

AECL's research expertise in sealing rings was used for the U.S. Space Shuttle Program.

Paul Ingham
Group Leader,
Experiment Group,
Thermalhydraulics
Branch, Whiteshell
Laboratories

The Blowdown Test Facility (BTF) in the NRU reactor at Chalk River has also been commissioned. This facility is designed to provide data, under well-controlled conditions, on fuel and fission product behavior during postulated accident scenarios where fuel assembly temperatures may rise above 1100° C. The first loss-of-coolant test in the facility is scheduled for mid-1990.

Advanced CANDU Designs

A committee of senior managers from the corporation has been given the mandate to establish an R&D program in support of an advanced CANDU reactor concept that will meet rapidly changing international power plant competition. It has defined a set of prioritized objectives and established a development strategy that builds on existing CANDU strengths and makes best use of new technologies.

For the short and medium term, the prime focus will be on programs that reduce initial plant cost and construction time, minimize the potential for human errors and improve the tolerance of the plant to minor upsets. Increased emphasis will be placed on the development of computer-based design tools, operator decision support and advanced control technology. Development of an advanced fuel bundle to provide increased operating margins will be accelerated, and we will begin development of passive heat removal systems.

For the longer term, a study has been initiated to define modifications in the design of the CANDU reactor that would increase shutdown margins, improve short- and long-term heat removal under accident conditions, and give added assurance that evacuation of the surrounding public would not be required as a result of any type of accident.

Mark Simpson
Research Technologist,
Accelerator Physics
Branch, Chalk River
Laboratories

Basic Science

AECL's neutron scattering facilities, based on the NRU research reactor, are continuing to be used by a growing body of scientists in such diverse fields as engineering, physics, chemistry and biology. In addition to our staff, more than 50 individuals, mainly professors and students from more than 30 universities and foreign laboratories, used these facilities this past year for basic research. This work included experiments on the different phases of ice, high-temperature superconductors, liquid helium and biological membranes.

Underlying research was also done on the use of low-temperature superconductivity as an innovative, non-destructive measure of hydriding in CANDU pressure tubes. Twelve industries were involved in contract research that included the examination of welds for the oil and gas pipeline industries, the strain in the booster-rocket casing of the NASA Challenger space shuttle, and a non-invasive method of temperature measurement for use with an operating jet engine.

By contributing to the storehouse of human knowledge, AECL Research scientists and engineers earn membership in both national and international scientific communities.

At AECL, our research in the health sciences underlies radiological protection. It was therefore fitting that, when the leader of that research for the last 28 years, Dr. Art Marko, retired this year, an international workshop on radiation protection should be convened at the Chalk River Laboratories. The event marked the contribution that AECL has made during that time to improving radiological safety. Examples included the environmental behavior, dosimetry and radiobiology of tritium and the development of thermo-luminescence for measuring radiation doses, a technology that is now widely used internationally.

The cyclotron at the recently completed TASCC (Tandem Accelerator SuperConducting Cyclotron) facility is a radically new design first proposed by Chalk River scientists. Commissioning results have exceeded all expectations, with the number of beams it can produce of different elements and energies increased from 12 to 17. During this same period, the TASCC tandem accelerator and its injector ran at the top of their form for a full slate of nuclear physics experiments.

Commercial Activities

Each of the main organizational units within AECL Research is responsible for performing commercial contract R&D in its area of expertise. Various services and products are also made available on a commercial basis. These services range from computer usage and reliability analysis to neutron radiography of gas turbine blades. Products include commercial devices based on our own special chemical catalysts and bulk isotopes. In total, our annual commercial revenues now exceed $40 million.

One of AECL Research's major commercial activities is the production of radioisotopes in its research reactors. A major review of the MAPLE-X10 project confirmed that this new AECL-designed research reactor is the most effective way to meet future commitments for production of radioisotopes.

The project is continuing with detailed design and testing, and preparation for construction. A significant share of the financing comes from a contract with Nordion International, formally the AECL Radiochemical Company. The use of MAPLE-X10 will permit the permanent shutdown and decommissioning of the NRX reactor at AECL's Chalk River Laboratories. At that time, the NRX will no longer be required as a backup for isotope production.

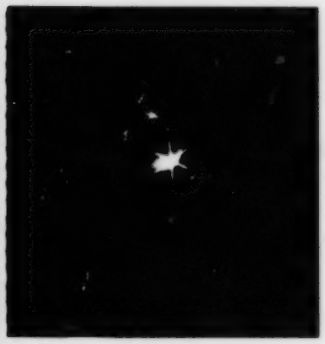
David Ward
Senior Research
Officer, Chalk River
Laboratories

Services and Common Facilities

Top-quality service staff and facilities are vital to R&D success. Over the past year, AECL Research has focused on enhancing facilities and procedures. The new position of General Manager, Major Projects, was established to ensure that major projects are managed within approved budgets, on schedule, and to technical standards that meet or exceed operational, safety and regulatory requirements.

Our Total Quality Management program, in its second year of implementation, is recognized as a strategic tool to help satisfy customers' increasingly stringent performance and value demands. A key target for the coming year will be to accelerate the implementation of this "quality" culture across all parts of AECL Research.

AECL scientists are making a significant contribution to environmental research.



◄ Bernadette Recoskie
Research Technologist,
Chemical Engineering
Branch, Chalk River
Laboratories

Radiation Applications

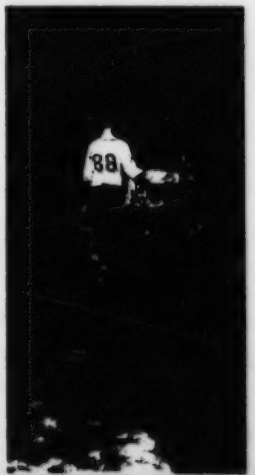
In May 1989, the federal Minister of Energy, Mines and Resources officially opened the Whiteshell industrial irradiator. This facility incorporates an electron accelerator, the I/10-1, used to study new industrial uses of ionizing radiation. Applications include the curing of carbon-fibre composites, wood fibre-reinforced polypropylene, food irradiation, sterilization of materials and improved wood pulp production. The facility is available to other organizations on a commercial basis.

Business Development

Full power operation of AECL's industrial accelerator prototype was achieved in November 1989. IMPELA, operating at full power of 50 kW, is the highest-power electron linear accelerator in the world for producing electron beam energies above 10 MeV. AECL now has a radiation-processing product that is clearly superior to the competing, lower-powered units, especially for industrial applications.

The Slowpoke Demonstration Reactor (SDR) at Whiteshell has operated under test conditions at 1 MW to verify reactor physics and thermal-hydraulic analyses, and will demonstrate the capability for hot-water space heating, as commissioning and licensing activities continue. At 1 MW, the fuel power density in Slowpoke is equivalent to that for the 10 MW SES-10 reactor being marketed for space-heating applications.

There continues to be strong interest in the availability of small reactors for heating and industrial purposes, both within Canada and abroad. For example, AECL Research was invited by the University of Saskatchewan to provide an economic and technical assessment of Slowpoke to heat campus buildings. The Province of Saskatchewan has agreed that if economic, technical, environmental and safety criteria are met, it will fund the necessary conversion of the heat distribution system to hot water heating. An environmental assessment is about to start. The economic and technical feasibility studies have been submitted to the university Board of Governors. A decision by the university on whether to proceed is expected in 1990.



Nuclear energy does not contribute to the greenhouse effect nor does it produce acid rain.

AECL CANDU

Over the past fiscal year, AECL CANDU continued its strategy of balancing the commercial work load between construction of new nuclear plants, service work in support of operating reactors and the provision of engineering services and expertise.

CANDU Support

AECL worked closely with Ontario Hydro to provide support to the Darlington generating station for the start-up of its first unit in November 1989. AECL and Ontario Hydro also allocated increased resources to the maintenance of the generating stations at Bruce and Pickering, and participated in studies for future nuclear plants.

AECL CANDU's support to operating stations increased significantly in 1989, and projections for 1990 indicate a continuation of that trend. Most of the work involves inspection services for the four CANDU 6 stations.

AECL CANDU continued its strategy of balancing the commercial work load between construction of new nuclear plants, service work in support of operating reactors and various demands for its engineering services and expertise.

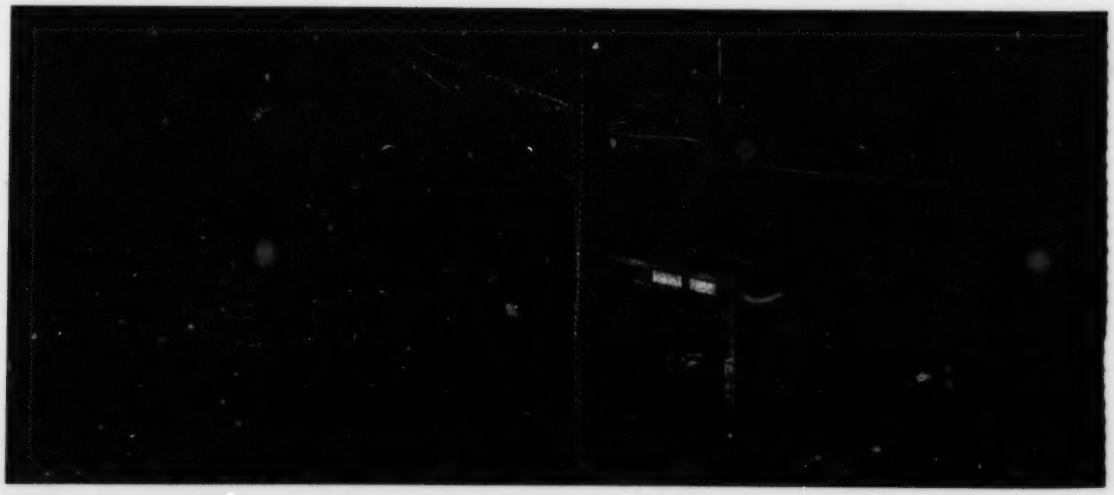
Contracts awarded by Hydro-Québec and New Brunswick Power included replacement of in-core flux detectors, pressure tube examination, licensing support, safety analysis and fuel management studies. Support services were also provided to the CANDU reactors in Argentina and Korea. All CANDU 6 stations recorded impressive performance ratings during the year, and were among the top-performing reactors in the world. The 1989 capacity factors were: Point Lepreau, New Brunswick – 95 percent; Wolsong, Korea – 91 percent; Embalse, Argentina – 89 percent; and Gentilly 2, Quebec – 86 percent.

Construction of the first unit of the five-unit Cernavoda station in Romania reached 44 percent completion. The change in government in Romania contributed a more realistic approach to the project scheduling and to the completion requirements. Agreements were reached for additional Canadian technical assistance that will improve both the quality assurance process and the progress of construction.

CANDU 3

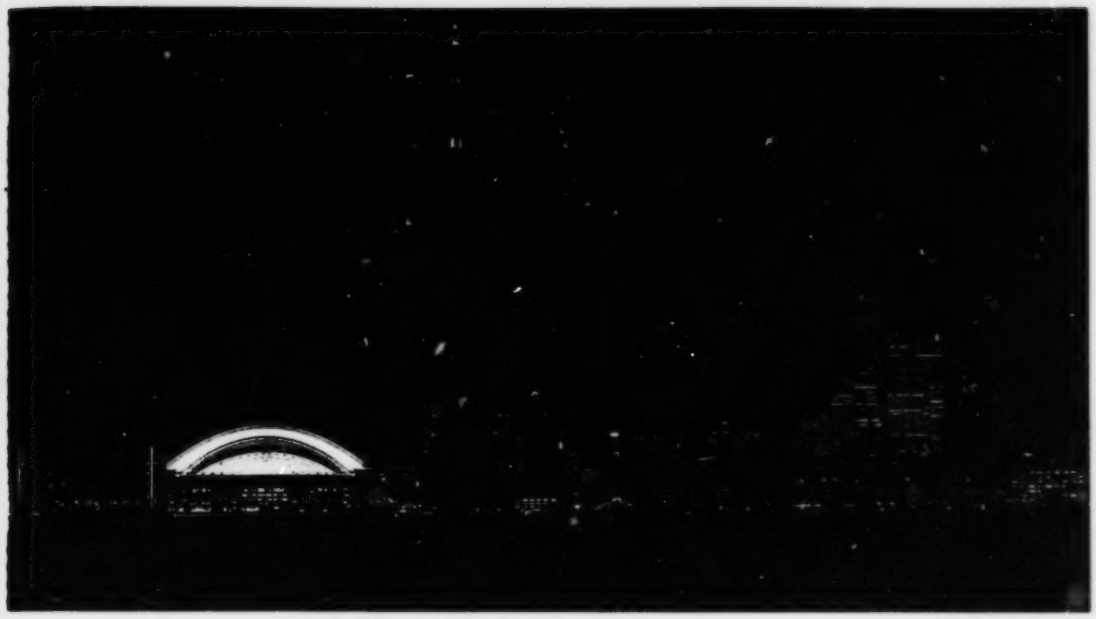
The design program for the latest reactor of the CANDU series – the 450-megawatt CANDU 3 – received high priority throughout the year. The project team of more than 200 engineers and technicians brought the design phase beyond the halfway mark. The team received support from private-sector consultants, equipment suppliers and CANDU owners. Work progressed on up-front licensing, design definitions and reviews, and operations and maintenance input from CANDU utilities.

The next phase of the program will involve completion of the detailed design for critical systems and equipment requiring a long manufacturing lead time. Also in the next phase are the review and approval of safety systems and components by the Atomic Energy Control Board, along with the development of project management systems.



3D modeling of the CANDU 3 using computer-aided design.

◄ George Mizuno
Manager, Lab Facilities
and Services Branch,
Sheridan Park



Many of the nuclear R&D programs performed by AECL are co-funded by our utility partners.

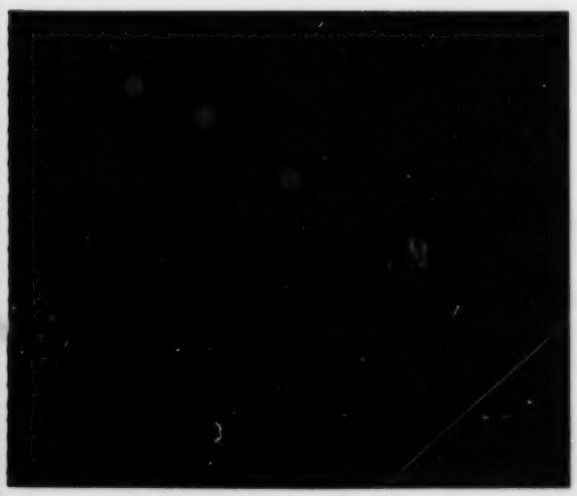
Engineering Services

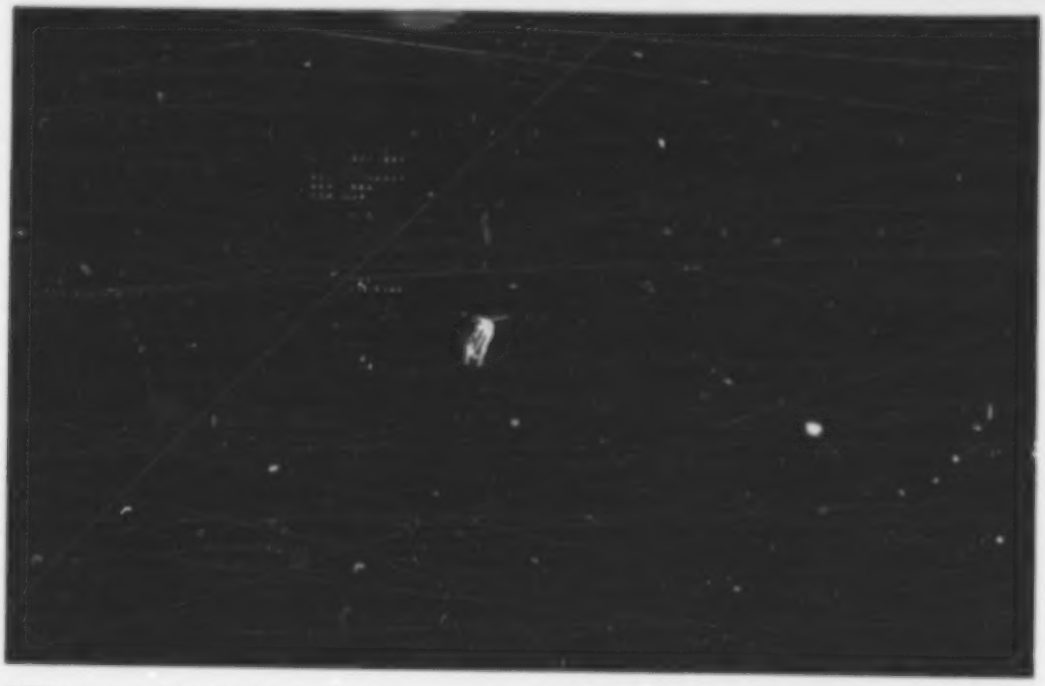
The nuclear-mechanical-electronic installation (NMEI), which was designed, developed and installed by AECL for Indonesia's national nuclear agency BATAN, was successfully completed and officially inaugurated by Indonesian President Suharto on December 11, 1989. Engineering work continued and construction started on another overseas project, the Korean Multipurpose Research Reactor.

Transfer of the used fuel from the decommissioned NPD station in Rolphton, Ontario, to above-ground concrete canisters was completed, and work has started on a similar project at the Point Lepreau station. A contract for the dry storage of fuel at the Wolsong station in Korea has also been secured, giving further tangible demonstration of the viability of this storage concept.

The Sheridan Park Engineering Laboratory (SPEL), a centre of excellence for engineering services, handles large and complex technical challenges. Its main focus is the support of operating nuclear stations. This year, as part of the large-scale fuel channel replacement program for units 3 and 4 at the Ontario Hydro Pickering Nuclear Generating Station, SPEL provided services for the design, fabrication and refurbishment of special tooling equipment and for site services. Other specialized services included the development of procedures, systems and training for remote repairs.

The Spacer Location and Repositioning (SLAR) program for the Pickering station also was successfully completed. This machine was then reconfigured, installed and tested for the Gentilly 2 reactor in Quebec. Electrical design for the installation of SLAR at the Bruce Nuclear Generating Station was completed.





Many countries around the world have a growing appetite for energy. In Korea, CANDU is helping to supply much-needed electricity.

Early in 1990, AECL CANDU received an invitation to submit a proposal for a second CANDU reactor at Wolsong, Korea. With the opening of an AECL Technologies office in Maryland, it also launched a successful entry into the U.S. power and research reactor retrofit market for digital control systems.

SPEL has committed a significant portion of its resources to the CANDU 3 development program. The laboratory also undertook an intensive program to qualify a polyurethane material for the walls of reactor containment buildings. This material was subsequently applied at the Gentilly 2 and Point Lepreau stations.

SPEL applied its expertise in nuclear fission to secure its first contract in fusion products. Through the Canadian Fusion Fuels Technology Project, a contract to manufacture uranium storage beds and scavenger beds for Kraftanlagen Heidelberg and KfK of the Federal Republic of Germany was successfully negotiated. SPEL also manufactured the containers required to ship these highly sophisticated products. Prototype containers that meet the standards of the International Atomic Energy Agency were subsequently developed.

AECL CANDU continues to apply its nuclear-based experience to the non-nuclear engineering sector. Achievements and activities this year include:

- the supply of radiation monitors to such steel and scrap metal companies as Algoma Steel, Atlas Steels, Cyclonet, Sidbec Dosco, Stelco Edmonton and Triple M Metals;
- the completion of the computer control system for unit 4 of New Brunswick's Courtenay Bay fossil-fired power station;
- a piping vibration analysis for Petro-Canada;
- a computer vision system, which locates defects for a high-speed automated fluorescent tube lamp assembly line, for General Electric (GE); and
- a feasibility study on autonomous robots in known environments for PRECARN Associates, under a subcontract from Ontario Hydro; this study led to a contract for the development of a prototype and for a further feasibility study on a robot that utilizes ultrasonic and vision systems.

AECL Technologies

Through its newly opened AECL Technologies office in Maryland, AECL CANDU successfully entered the U.S. power and research reactor retrofit market for digital control systems. U.S. customers included the Tennessee Valley Authority, Florida Power and Light, Philadelphia Electric Company and Penn State University. CANDU-applied technology, along with a U.S. presence, is expected to result in additional business opportunities in nuclear plant decommissioning and technical consulting.

AECL Technologies has also advised the U.S. Nuclear Regulatory Commission that it intends to submit the CANDU 3 generic design for Standard Design Certification.

Marketing Activities

Marketing and sales activities, financed by work-generated revenue, progressed throughout the year as AECL CANDU explored and evaluated future prospects, both domestically and internationally.

The Canadian nuclear industry has given the world safer, more efficient medical procedures.

From the generation of electricity to the production of radio-isotopes for medical applications, nuclear power has contributed to Canada's enviable quality of life.

In 1989, nuclear energy provided 16 percent of Canada's total electricity production.

Early in 1990, an invitation to submit a proposal was received from the Korea Electric Power Corporation for a second CANDU at the Wolsong site.

The Electric Power Development Corporation of Japan (EPDC) continues its long-term collaboration with AECL and provides revenues of approximately $2 million per year for safety and fuel cycle studies. The ultimate aim of the relationship is to introduce CANDU into Japan.

For a number of years, the corporation has worked closely with various countries that are considering embarking on nuclear power programs or expanding their existing efforts. An example is the Netherlands, where CANDU's safety features have made it a credible option for consideration once a decision is reached to proceed with construction of new nuclear plants. AECL and Ontario Hydro have completed the first phase of a CANDU feasibility study for Hungary, while a fuel manufacturing localization program for Egypt undertaken jointly by AECL and Bechtel continues.

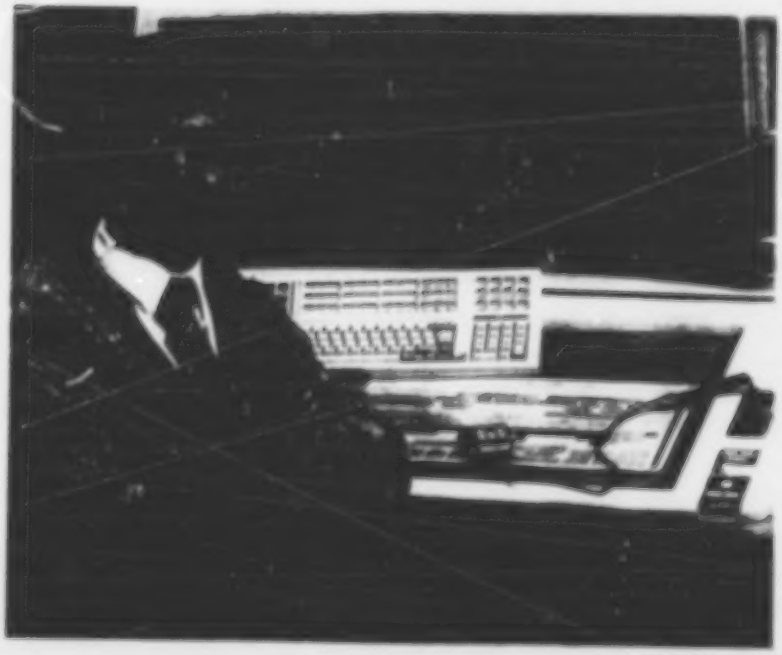
There have been very positive indications of an upturn in the domestic reactor market, particularly the two Canadian provinces that already rely on nuclear power: Ontario and New Brunswick. Ontario Hydro's 25-year Demand/Supply Plan calls for 12 new CANDU reactors, the first to be in service in 2003, as one of its preferred options for meeting future electricity requirements. To meet the growing Western Canada interest in CANDU,

particularly in Saskatchewan, an AECL Vice-President of Marketing, Western Region, was appointed in January 1990, and an office was opened in Saskatoon.

Other Highlights

In 1989-90, AECL CANDU launched a major initiative aimed at quality improvement. The program's aim is to enhance the organization's efficiency and effectiveness in a highly competitive marketplace. Staff were brought up-to-date on quality principles and techniques, and teams were set up to stimulate and support actions that will lead to perceptible progress in the quality area.

The development of affiliations and partnerships with associated organizations has also received special attention. This year, an important first step to increased joint private- and public-sector participation in Canada's nuclear power industry was taken when AECL and GE Canada agreed to pool design capabilities for fuel-handling systems for the CANDU 3 design.



Fidel Di Caro
Design Draftsman,
CANDU 3,
Sheridan Park

Nuclear energy provides a safe, clean and affordable source of electricity.

AECL Around the World

AECL has built a reputation as a global supplier of nuclear energy systems and technology. Outside Canada, there are CANDU systems in Korea, Argentina, Pakistan, Romania and India. To strengthen its role internationally, the corporation has established offices outside Canada in Washington, The Hague, Seoul, Buenos Aires and Bucharest.

AECL's regional offices exist to provide support to existing operating CANDU reactors, such as the CANDU 6 at Wolsong, Korea. They also provide a local headquarters for major CANDU construction projects such as the one under way at the proposed five-unit Cernavoda station in Romania. Finally, AECL's offices are focal points for the development of new business opportunities that will circle the globe, embracing both existing markets and major new markets such as the United States.

In the near term, new international business looks promising in Korea, where a second CANDU 6 unit is being considered for the Wolsong facility. AECL also expects increased worldwide interest in the new CANDU 3 450-megawatt reactor to increase, once the green light is received for a prototype installation. Point Lepreau, New Brunswick, seems a likely candidate for the world's first operating CANDU 3 unit.

Just as AECL's marketing efforts reach out to all corners of the globe, so does its work with experts from all facets of the international nuclear community.

Since its earliest days, AECL has led Canada's participation in the development of the peaceful uses of nuclear energy within the international community. Scientists and engineers from many countries, industrialized and developing, have enhanced their skills through training and fellowship programs at the research and design facilities of AECL. At the same time, AECL specialists regularly participate in the work of international agencies such as the Nuclear Energy Agency (NEA) of the Organization for Economic Co-operation and Development (OECD) and the International Atomic Energy Agency (IAEA).

AECL's role in the work of the IAEA, in recent years, has focused on the improvement of the safety of nuclear power plants and assistance to developing countries through training and technology transfer. For example, in October 1989, AECL, with the cooperation of the IAEA, hosted an international symposium attended by 152 participants from 36 countries on "Research reactor safety, operation and modification" at its Chalk River Laboratories.

During the past year, AECL representatives also played active roles in public information exchanges. These sessions, including one held for IAEA members in Toronto, highlighted the various information programs in progress around the world. Although the approaches may vary from country to country, the aim of each of these programs is to inform the public about nuclear energy.

One of the less noticeable but effective ways of assisting in the development of nuclear energy is through the exchange of information at international conferences and symposia. Within the past year, AECL has played a significant role in the planning of the 7th Pacific Basin Nuclear Conference held in March of this year and has taken the lead in preparing for a major international conference on nuclear power and the environment to be held in Toronto in 1993. AECL staff also played a key part in developing the technical program for the very successful 1989 World Energy Conference held in Montreal.

AECL has cooperative agreements, covering the exchange of information and technology, with many countries. In 1989, relationships between Canada and the U.S.S.R. in the nuclear field were re-established and a program of exchange visits between AECL scientists and engineers and their Soviet counterparts has begun. The early focus of these visits has been the safety of nuclear power plants. Future visits will address a broader range of topics of mutual interest.

Whether through its scientific exchanges, its global marketing efforts, or its vigilant protection of the atom for peaceful purposes exclusively, AECL is a major player on the international stage.

Financial Review

Not since 1977-78 has AECL incurred a loss from its overall activity. In the 11 subsequent years through 1988-89, operations generated $160 million of net income. But this past year has been particularly difficult and it should come as no surprise that a twelfth successive year of profit has proved unattainable. Our Corporate Plan had anticipated a loss of $3.3 million. However, the successful resolution, upon which the plan was based, of the serious issue of inadequate external funding for R&D was not achieved until year-end and as a consequence the actual loss was $10.2 million. Nevertheless, subject to a successful outcome to negotiations for a commercial sale of the prototype CANDU 3 reactor, the stage now appears well set for a return to profitability in the current year.

The fiscal period just ended was the first full year the corporation faced without earnings from the radiation equipment and isotopes businesses of its former subsidiaries, Nordion and Theratronics. These companies – sold to Canada Development Investment Corporation (CDIC) on September 30, 1988, for privatization – contributed $14.1 million to consolidated 1989 net income during the six months of AECL ownership. Their divestment leaves a significant gap in our commercial picture. The terms of the agreement with CDIC require it to pay to AECL the net proceeds realized from eventual privatization. At that time, it is anticipated that a capital gain on the divestment will be recorded and that the proceeds will be fully distributed to the shareholder.

Financial Highlights
(millions of dollars)

	1990	1989
Nuclear Power Operations		
Revenue	169	158
Operating profit	10	35
Research and Development Operations		
Expenses	256	248
Parliamentary appropriations	154	147
Net Income (loss)	(10)	23

Nuclear Power Operations

Consolidated revenue under this heading was $169 million in 1990 compared with $158 million in 1989. Within these totals, revenue from our core business, nuclear supply and services, rose 12 percent to $99 million, the highest level since 1986. The increase reflects higher revenue realized on offshore projects and stronger performance in providing services for domestic utilities, principally Ontario Hydro. Notwithstanding this improvement, operating profit, while meeting Corporate Plan targets, was reduced to $9.8 million from last year's level of $35.1 million. The decline was due primarily to the better performance of the Argentine contract debt in 1989 as well as a favorable adjustment recognized in that year in respect of costs applicable to 1988 heavy water sales. Because of these two factors, the ratio of cost of sales to revenue in 1989 was significantly lower than in 1990.

Increased marketing emphasis during the year to address current opportunities in Korea and New Brunswick also contributed to the decline in operating profit. Negotiations for a contract are being pursued in Korea for a second CANDU unit. Negotiations with New Brunswick Power for a prototype CANDU 3 reactor continued during the year and support from the federal government for taking these to the next phase was received at year-end.

Ontario Hydro's Pickering Units 1 and 2 are now in the second year of service after an extended shutdown for pressure tube replacements. Again this year, no revenue from AECL's investment was generated because of the continuing impact of the cumulative shutdown costs on payback entitlement. Under the terms of the agreement with Ontario Hydro, future revenue is dependent on future coal costs at the reference Lambton coal-fired station and remains uncertain as to timing and amount. Pickering payback is important to AECL's financial performance and the position and outlook are kept under regular management review. Amortization of the investment for the full year generated a charge of $5.5 million in 1990 compared with $2.3 million for a five-month period in 1989.

CANDU 3 pre-project engineering design work continued throughout the year with expenditures of $29.2 million reported as part of product development costs and fully funded by parliamentary appropriation. Completion of the program will require a further investment of $72 million over the next two years.

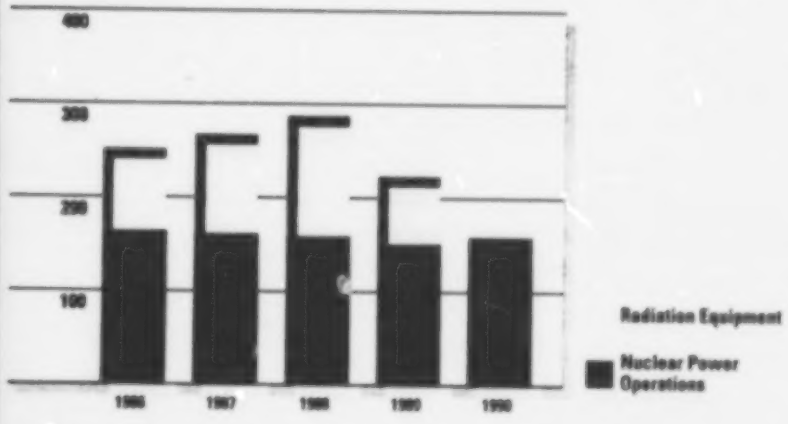
R&D Operations

A major objective over the last several years has been to reduce the federal government's proportionate share of funding for our R&D activities. Since 1985, this has decreased from 87 percent of total expenses to 60 percent, achieved largely through replacement funding from R&D beneficiaries and through increasing R&D contract revenue. Further progress has now been made with the announcement at year-end of planned increases of approximately $35 million for each of the next seven years in the funding of cost-shared R&D work by Canadian utilities with nuclear generating facilities, principally Ontario Hydro. The federal government has also agreed to increase its annual funding over the previous approved reference level by $31.5 million. This, in effect, terminates the remaining balance of the original five-year cutbacks of $100 million announced in the May 1985 budget. The aggregate reductions successfully absorbed by the corporation amount to $70 million (1985 dollars).

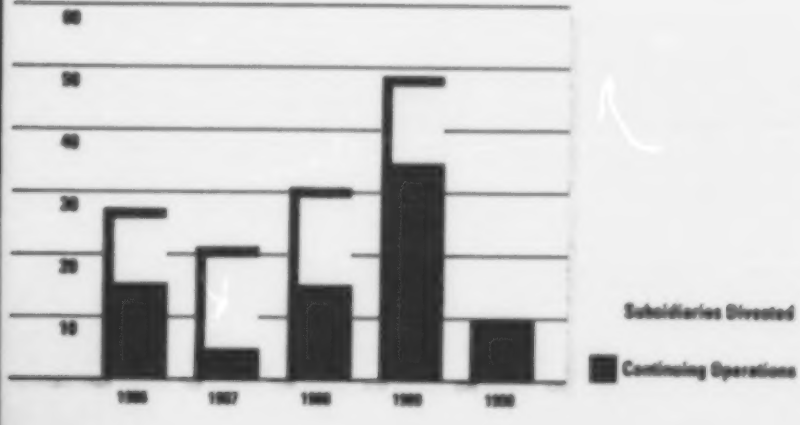
Total R&D expenses were $256.1 million, an increase of 3 percent over last year. This reflects a request by the shareholder at the start of the year that R&D activity be maintained at a level consistent with the previous year pending completion of its review of an appropriate level for ongoing funding support. This necessitated a continuing commitment of the corporation's internal resources and consequently, research and development operations generated a charge of $20.0 million against consolidated income, compared with $19.3 million in 1989.

Capital spending on property, plant and equipment not primarily for the generation of commercial revenue, and therefore included in total R&D expenses, amounted to $13.0 million, slightly lower than last year's $14.1 million. Additionally, $4.2 million was invested in the continuing construction of a commercially oriented isotope production facility, funded by third-party capital contributions. Capital spending for R&D has been steadily reduced since 1985 due to government funding cutbacks. As a result of the new arrangements now in place, additional funds can be allocated to this area, including ongoing replacement of aging assets.

Revenue
(millions of dollars)

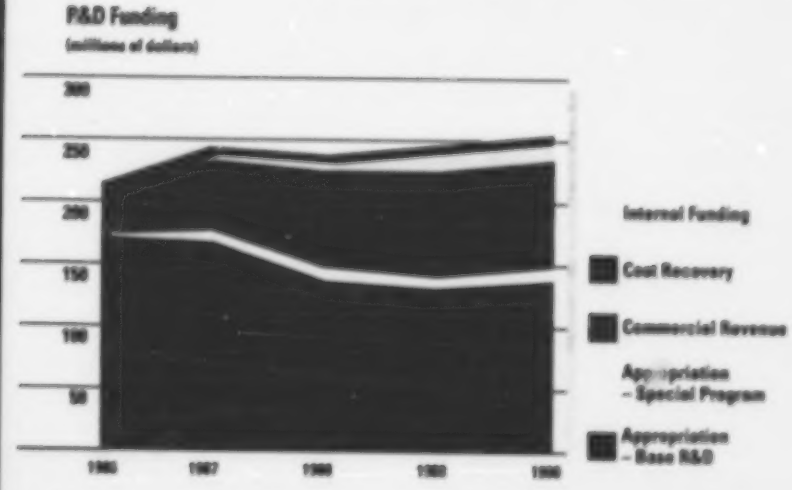


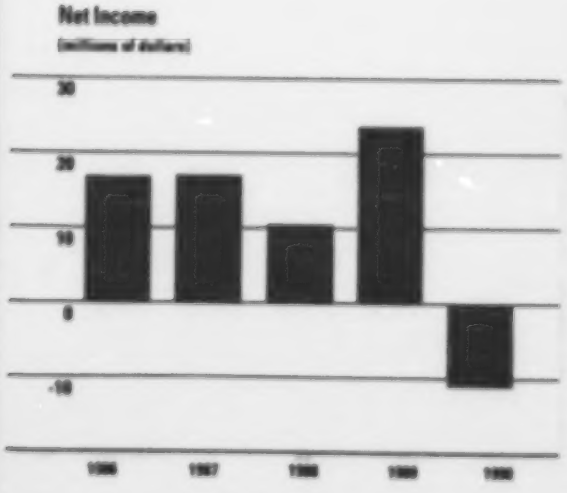
Operating Profit
(millions of dollars)



Decommissioning Activities

Maintenance and surveillance activities continued for all facilities in a safe-storage mode, namely the Nuclear Power Demonstration (NPD), Gentilly-1 and Douglas Point reactors as well as the Cape Breton and LaPrade heavy water plants. Spending in 1990 for decommissioning operations totalled $15.9 million, 14 percent lower than in 1989, reflecting completion of the NPD program during the year. Next year's program will include additional assets requiring decommissioning such as the WR-1 organic-cooled research reactor, which operated successfully at Whiteshell from 1965 to 1985. To help fund these activities, the government has authorized retention of surplus proceeds from asset sales, normally returned to the government, for application against future program costs.





Changes in Financial Position

The corporation's year-end cash position of $46.7 million was distorted by the exclusion of $40.3 million of parliamentary appropriations not received until the first few days of April 1990. Had this unusual delay not occurred, cash and short-term deposits on March 31 would have totalled $87.0 million, compared with $86.6 million a year earlier.

Adjusted to eliminate this distortion, operations in 1990 approximately broke even on a cash flow basis. In 1989, a higher level of earnings and the receipt of $16.4 million in government funding, relating to the preceding year's spending on the CANDU 3 development program, generated cash flow from operations of $47.4 million. New investment in commercial fixed assets, net of disposal proceeds, was only $2.3 million this year, compared with an already modest $3.6 million in 1989. These totals exclude assets acquired for the CANDU 3 program, which were expensed as incurred. The positive generation of $2.1 million from financing activities in 1990 includes a parliamentary appropriation of $3.7 million related to our 1989 divestment of subsidiaries, which has been credited to contributed capital. In 1989, a dividend was paid to the shareholder as part of overall financing arrangements for CANDU 3 development and this largely resulted in a negative cash flow of $17.1 million from financing activities for that year.

Overall, the corporation's closing cash position, in combination with the balance of funds received in April, leaves us with adequate working capital for the year now under way. AECL's profit and cash flow performance over the past few years has been adversely affected by the amount of internal funding required to maintain a vital R&D program. With the return of a stable level of funding for this program, we are in a stronger financial position to address new business opportunities expected in the coming year.

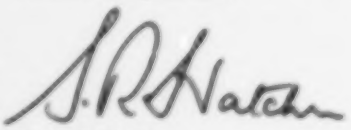
Management Responsibility

The financial statements and all other information presented in this Annual Report are the responsibility of the management and the Board of Directors of the corporation. The financial statements have been prepared in accordance with generally accepted accounting principles and include estimates based on the experience and judgement of management.

The corporation maintains books of account, financial and management control, and information systems, together with management practices designed to provide reasonable assurance that reliable and accurate financial information is available on a timely basis, that assets are safeguarded and controlled, that resources are managed economically and efficiently in the attainment of corporate objectives, and that operations are carried out effectively. These system and practices are also designed to provide reasonable assurance that transactions are in accordance with Part X of the Financial Administration Act and its regulations, as well as the Canada Business Corporation Act, the articles, and the bylaws and policies of the corporation. The corporation has met all reporting requirements established by the Financial Administration Act, including submission of a corporate plan, an operating budget, a capital budget and this Annual Report.

The corporation's internal auditor has the responsibility for assessing the management systems and practices of the corporation. The Auditor General of Canada conducts an independent examination of the financial statements of the corporation and reports on his examination to the Minister of Energy, Mines and Resources.

The Board of Directors' Audit Committee, composed of directors who are not employees of the corporation, reviews and advises the Board on the financial statements, the Auditor General's reports thereto and the plans and reports related to special examinations, and oversees the activities of internal audit. The Audit Committee meets with management, the internal auditor and the Auditor General on a regular basis.



Stanley R. Hatcher
Acting President and
Chief Executive Officer
AECL

David G. Cubberson
Vice-President, Finance and
Chief Financial Officer
AECL

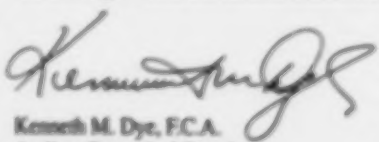
Auditor's Report

To the Minister of Energy, Mines and Resources

I have examined the balance sheet of Atomic Energy of Canada Limited as at March 31, 1990 and the statements of income, contributed capital, retained earnings and changes in financial position for the year then ended. My examination was made in accordance with generally accepted auditing standards, and accordingly included such tests and other procedures as I considered necessary in the circumstances.

In my opinion, these financial statements present fairly the financial position of the corporation as at March 31, 1990 and the results of its operations and the changes in its financial position for the year then ended in accordance with generally accepted accounting principles applied on a basis consistent with that of the preceding year.

Further, in my opinion, the transactions of the corporation that have come to my notice during my examination of the financial statements have, in all significant respects, been in accordance with Part X of the Financial Administration Act and regulations, the Canada Business Corporation Act.



Kenneth M. Dye, F.C.A.
Auditor General of Canada
Ottawa, Canada
May 4, 1990

Summary of Significant Accounting Policies

These financial statements have been prepared in accordance with generally accepted accounting principles applied on a consistent basis. The most significant accounting policies are summarized below:

Foreign Currency Translation

Transactions denominated in a foreign currency are translated into Canadian dollars at the exchange rate in effect at the date of the transaction, except those covered by forward exchange contracts, where the rate established by the terms of the contract is used. Monetary assets and liabilities outstanding at the balance sheet date are adjusted to reflect the exchange rate in effect at that date. Exchange gains and losses arising from the translation of foreign currencies are included in income.

Inventories

Heavy water is valued at the lower of average cost, less related parliamentary appropriations, and net realizable value. Maintenance and general supplies are valued at cost.

Investment

The corporation has an investment in Pickering reactor Units 1 and 2. This is recorded at cost and is being amortized on a straight-line basis over the remaining term of the related investment agreement.

Property, Plant and Equipment

Property, plant and equipment of a research and development nature are recorded at cost and expensed in the year of acquisition.

Other property, plant and equipment are recorded at cost and depreciated on a straight-line basis over the estimated useful life of the asset as follows:

Machinery and equipment – 3 to 20 years
Buildings – 20 to 50 years

Costs of decommissioning nuclear facilities are expensed when incurred.

Long-term Contracts

Revenue and costs on long-term contracts are accounted for by the percentage of completion method, applied on a conservative basis to recognize the absence of certainty on these contracts. Full provision is made for all estimated losses to completion of contracts in progress.

Parliamentary Appropriations

The Government of Canada, through parliamentary appropriations, funds certain operations of the corporation as outlined in Note 2. The parliamentary appropriations are offset against the applicable expenditures except for the portion used to discharge certain loan principal which is recognized as an increase in contributed capital.

Pension Plan

Employees are covered by the Public Service Superannuation Plan administered by the Government of Canada. The corporation's contributions to the Plan are limited to an amount equal to the employees' contributions on account of current service. These contributions represent the total pension obligations of the corporation and are charged to income on a current basis.

Employee Termination Benefits

Employees are entitled to specific termination benefits as provided for under collective agreements and conditions of employment. The liability for these benefits is charged to income as benefits accrue to the employees. The accumulated liability is actuarially determined on a periodic basis.

Statement of Income

For the year ended March 31, 1990

	1990	1989
		(thousands of dollars)
Nuclear Power Operations		
Revenue		
Nuclear supply and services	$ 99,383	$ 88,922
Interest on long-term receivables	58,737	59,664
Interest on short-term deposits	10,642	9,137
	168,762	157,723
Costs and expenses		
Cost of supply and services	71,957	41,341
Product development	32,920	33,023
Less: Parliamentary appropriations (Note 2)	(29,200)	(28,000)
Marketing and administration	31,245	22,287
Interest on long-term debt	52,071	53,952
	158,993	122,603
Operating profit	9,769	35,120
Research and Development Operations		
Expenses	256,064	248,216
Less: Commercial revenue	34,476	32,258
Cost recovery	47,854	49,808
Parliamentary appropriations (Note 2)	153,722	146,879
Net expense	20,012	19,271
Decommissioning Activities		
Expenses	15,954	18,632
Less: Parliamentary appropriations (Note 2)	12,023	10,309
Recovery from asset sales	3,931	1,598
Net expense	—	6,725
Income (loss) from continuing operations	(10,243)	9,124
Income from subsidiaries divested (Note 3)	—	14,109
Net income (loss)	$ (10,243)	$ 23,233

Balance Sheet

As at March 31, 1990

	1990	1989
		(thousands of dollars)
Assets		
Current		
Cash and short-term deposits	$ 46,669	$ 86,588
Due from Government of Canada	40,253	—
Accounts receivable	154,387	147,776
Receivable from CDIC (Note 3)	114,607	114,607
Inventories (Note 4)	3,256	3,727
	359,172	352,698
Heavy water inventory (Note 4)	8,096	8,586
Long-term receivables (Note 5)	498,310	541,343
Investment (Note 6)	76,164	81,704
Property, plant and equipment (Note 7)	10,004	9,576
	$ 951,746	$ 993,907
Liabilities		
Current		
Accounts payable and accrued liabilities	$ 113,877	$ 112,592
Current portion of long-term debt	33,871	31,346
	147,748	143,938
Deferred revenue	20,394	31,408
Accrued employee termination benefits	43,702	39,865
Long-term debt (Note 8)	529,114	562,986
	740,958	778,197
Shareholder's Equity		
Capital stock		
Authorized – 75,000 common shares		
Issued – 54,000 common shares	15,000	15,000
Contributed capital	79,228	73,907
Retained earnings	116,560	126,803
	210,788	215,710
	$ 951,746	$ 993,907

Approved by the Board:

Marnie Paikin

Marnie Paikin, Director

S. R. Hatcher

Stanley R. Hatcher, Director

Statement of Contributed Capital

For the year ended March 31, 1990

	1990	1989
		(thousands of dollars)
Balance at beginning of the year	**$ 73,907**	$ 72,418
Parliamentary appropriations (Note 2)		
Loan principal repayment	**1,621**	1,489
Payment in respect of subsidiaries divested	**3,700**	—
	5,321	1,489
Balance at end of the year	**$ 79,228**	$ 73,907

Statement of Retained Earnings

For the year ended March 31, 1990

	1990	1989
		(thousands of dollars)
Balance at beginning of the year	**$ 126,803**	$ 119,970
Net income (loss)	**(10,243)**	23,233
Dividend	**—**	(16,400)
Balance at end of the year	**$ 116,560**	$ 126,803

Statement of Changes in Financial Position

For the year ended March 31, 1990

	1990	1989
	(thousands of dollars)	
Operating Activities		
Net income (loss)	$ (10,243)	$ 23,233
Depreciation and amortization	7,426	6,211
	(2,817)	29,444
Decrease (increase) in operating working capital		
Due from Government of Canada	(40,253)	—
Other	3,320	17,912
	(36,933)	17,912
Cash from (used in) operations	(39,750)	47,356
Investing Activities		
Divestment of subsidiaries (Note 3)	—	114,607
Receivable from CDIC (Note 3)	—	(114,607)
Acquisition of commercial property, plant and equipment, net of disposal	(2,314)	(3,569)
Cash invested	(2,314)	(3,569)
Financing Activities		
Repayment of long-term debt	(31,347)	(28,214)
Proceeds from long-term notes receivable	28,171	25,976
Contributed capital from parliamentary appropriations	5,321	1,489
Dividend	—	(16,400)
Cash from (used in) financing	2,145	(17,149)
Increase (decrease) in cash and short-term deposits	(39,919)	26,638
Cash and short-term deposits at beginning of the year	86,588	59,950
Cash and short-term deposits at end of the year	$ 46,669	$ 86,588

Notes to the Financial Statements

For the year ended March 31, 1990

1. Accounting Policies

The summary of significant accounting policies is an integral part of these financial statements.

2. Parliamentary Appropriations

Parliamentary appropriations were used during the year for the following purposes:

	1990	1989
		(thousands of dollars)
Research and development operations	$ 153,722	$ 146,879
CANDU 3 pre-project costs	29,200	44,400
Decommissioning activities	12,023	10,309
Heavy water plant loan principal	1,621	1,489
Subsidiaries divested	9,074	—
	$ 205,640	$ 203,077

Parliamentary appropriations in respect of subsidiaries divested were to reimburse the corporation for expenditures subsequent to the divestment and to compensate the corporation for certain cash flows foregone as a result of the divestment. The latter, amounting to $3.7 million, was credited to contributed capital.

3. Subsidiaries Divested

In March 1988, the Government of Canada announced its intention to privatize the corporation's radiation equipment and isotope businesses conducted by the Radiochemical Company and the Medical Products Division, both operating divisions of the corporation. Subsequently, these divisions were incorporated under the names Nordion International Inc. (Nordion) and Theratronics International Limited (Theratronics), respectively. On September 30, 1988, the corporation sold its shares in Nordion and Theratronics to Canada Development Investment Corporation (CDIC) for eventual privatization. Under the terms of the agreement with CDIC, the corporation will receive full proceeds realized upon the privatization of Nordion and Theratronics, less CDIC's expenses associated therewith. While the corporation anticipates a gain on sale, the amount cannot reasonably be determined at this time. The receivable from CDIC of $114.6 million represents the September 30, 1988, net book value of the businesses sold.

Income from Nordion and Theratronics for the six months ended September 30, 1988, has been reflected in the statement of income for the year ended March 31, 1989, as income from subsidiaries divested. Revenues of Nordion and Theratronics were $70 million for that six-month period.

4. Inventories

	1990	1989
	(thousands of dollars)	
Current		
Maintenance and general supplies	$ 3,256	$ 3,727
Heavy water	$ 544,799	$ 548,964
Less: Parliamentary appropriations	536,703	540,378
	$ 8,096	$ 8,586

Parliamentary appropriations for heavy water are repayable to the government, together with interest thereon, to the extent of future revenue from sales of related heavy water. Accrued liabilities as at March 31, 1990, include $2.9 million in respect of net proceeds from sales during the year (1989 – $4.9 million).

5. Long-term Receivables

	1990	1989
	(thousands of dollars)	
Notes receivable from provincial utilities in respect of the financing of nuclear facilities refer to Note 8 for related debt)	$ 522,118	$ 550,289
Contract receivables maturing through 1998	39,091	35,719
Mortgages receivable and other	3,001	3,462
	564,210	589,470
Current portion	65,900	48,127
	$ 498,310	$ 541,343

6. Investment

The corporation, Ontario Hydro and the Province of Ontario are parties to an agreement for the construction and operation of Units 1 and 2 of the Pickering 'A' nuclear generating station, with ownership of these Units being vested in Ontario Hydro. Under the agreement, the corporation is entitled to receive payments until the year 2003 based on the net operational advantage of the power generated by Pickering Units 1 and 2 as compared with the coal-fired Lambton Units 1 and 2. Due primarily to costs incurred during the 1984-88 shutdown of the Pickering units for pressure tube replacement, no payment was received this year. The timing of the resumption of payments under the agreement remains uncertain since it depends on the future operating costs, including the cost of coal, of the Lambton units.

The charge against 1990 earnings for amortization of the investment in Pickering was $5.5 million (1989 – $2.3 million).

7. Property, Plant and Equipment

	1990			1989
			(thousands of dollars)	
	Cost	Funding and accumulated depreciation	Net	Net
Nuclear power operations				
Land and improvements	$ 1,175	$ 568	$ 607	$ 604
Buildings	9,860	9,739	121	97
Machinery and equipment	21,822	15,233	5,789	4,689
	32,857	25,540	6,517	5,390
Research and development operations				
Land and improvements	11,537	11,537	—	—
Buildings	80,451	78,332	2,119	2,581
Reactors and equipment	235,307	233,939	1,368	1,605
Construction in progress	62,302	62,302	—	—
	389,597	386,110	3,487	4,186
	$ 421,654	$ 411,650	$ 10,004	$ 9,576

Depreciation of property, plant and equipment for the year ended March 31, 1990 amounted to $1.9 million (1989 – $3.1 million).

Research and development property, plant and equipment expensed during the year amounted to $13.0 million (1989 – $14.1 million).

8. Long-term Debt

	1990	1989
Loans from Government of Canada		(thousands of dollars)
To finance provincial utility nuclear facilities, maturing through 2008 at fixed interest rates varying from 6.687% to 9.706% (refer to Note 5 for related receivables).	$ 521,700	$ 549,774
To finance leased heavy water and other assets, maturing through 2008 at fixed interest rates varying from 5.0% to 12.434%.	22,316	24,002
Loans from third parties		
To finance the purchase of the Glace Bay heavy water plant, maturing through 1998 at an imputed interest rate of 8.875%.	18,969	20,556
	562,985	594,332
Current portion	33,871	31,346
	$ 529,114	$ 562,986

Loan repayments required over succeeding years are as follows (millions of dollars): 1991 – $33.9; 1992 – $36.6; 1993 – $33.1; 1994 – $16.1; 1995 – $17.3; and subsequent to 1995 – $426.0.

9. Decommissioning Activities

Decommissioning activities consist of placing and maintaining prototype reactors in a safe-storage mode as the initial stage of decommissioning, as well as the activities associated with closure and protection of heavy water plants. Funding for these activities is provided through parliamentary appropriations and proceeds from related asset sales.

Prototype reactors

The decommissioning of nuclear research and prototype facilities is an integral part of the nuclear program. Currently, the Gentilly-1, Douglas Point and Nuclear Power Demonstration (NPD) prototype reactors are in a safe-storage mode. The WR-1 reactor was shut down in 1985 and its decommissioning commenced during the year. The estimated cost of the initial stage of decommissioning of WR-1 is $20 million.

Future net costs related to decommissioning nuclear facilities beyond the safe-storage mode cannot be quantified at this time due to uncertainty as to the nature and timing of the disposal alternative that will ultimately be adopted in each case. In accordance with the corporation's accounting policy, any such costs will be expensed when incurred.

All reactors in the decommissioning stage have been fully written off. The original gross cost of these reactors is $216 million, including $31 million for capitalized heavy water.

Heavy water plants

The corporation has closed down the three heavy water plants located in Glace Bay and Port Hawkesbury in Cape Breton, Nova Scotia and in LaPrade, Quebec. These assets, which have been fully written off, had an original gross cost of $803 million.

10. Related Party Transactions

In addition to the transactions disclosed elsewhere in these financial statements, the corporation had the following transactions with the Government of Canada:

	1990	1989
		(thousands of dollars)
Repayment of loans and interest	$ 88,790	$ 85,005
Payments to the Public Service Superannuation Plan	$ 11,744	$ 11,586

In the normal course of business, the corporation also enters into various transactions with the Government of Canada, its agencies and other Crown corporations.

11. Supplementary Information

Incorporation

Pursuant to the authority and powers of the Minister of Energy, Mines and Resources under the Atomic Energy Control Act, the corporation was incorporated in 1952 under the provisions of the Canada Corporations Act (and continued in 1977 under the provisions of the Canada Business Corporations Act) to develop the utilization of atomic energy for peaceful purposes.

The corporation is a Schedule III Part I Crown corporation under the Financial Administration Act. The corporation is exempt from income taxes.

Corporate Plan

Pursuant to the Financial Administration Act, the corporation is required to submit a Corporate Plan for approval by the Governor in Council. The Corporate Plan for 1989/90-1993/94 was submitted, but approval was deferred pending the results of a review of the mandate and scope of operations of the corporation in conjunction with a restructuring of the nuclear industry in Canada.

Insurance

To the extent deemed appropriate, the corporation carries conventional insurance for its facilities and heavy water inventories. Decommissioned prototype reactors are self-insured.

Sales Agents' Remuneration

Guidelines concerning the commercial practices of Crown corporations require disclosure of sales agents and the total remuneration paid to them during the year.

Remuneration and expenses paid to the following sales agents and representatives in 1990 aggregated $1.0 million:

B.C. Park, U.S.A.; Marubeni Corporation, Japan; PII - PED International Inc., U.S.A.; P.T. Sanga Kencana International, Indonesia; Yuksel Nedim Yalcin, Turkey.

In 1989, such remuneration and expenses, including payments to sales agents and representatives of Nordion and Theratronics, aggregated $2.5 million.

Five-Year Financial Summary

	1990	1989	1988	1987	1986
Operations			(millions of dollars)		
Revenue:					
Nuclear power operations	**169**	158	165	166	167
Radiation equipment and isotopes*	**—**	70	125	111	93
	169	228	290	277	260
Operating profit*	**10**	49	32	22	28
Net income (loss)	**(10)**	23	10	17	17
Research and development expenses	**256**	248	251	242	226
Financial Position					
Cash and short-term deposits	**47**	87	60	58	55
Long-term receivables	**498**	541	568	597	699
Investment and deferred costs	**76**	82	106	108	110
Capital expenditures	**20**	23	26	28	23
Property, plant and equipment (net)	**10**	10	50	54	52
Total assets	**952**	994	1,036	1,018	1,107
Long-term debt	**529**	563	594	623	649
Shareholder's equity	**211**	216	207	196	177
Other					
Parliamentary appropriations	**205**	203	175	218	275
Export revenues	**54**	121	179	150	141
Number of employees	**4,337**	4,274	4,892	5,007	5,540

* Includes the results of Nordion and Theratronics up to September 30, 1988, the date of sale to Canada Development Investment Corporation.

The Board of Directors

*†•‡ **M. Paikin,** B.A., LL.D.,
Acting Chairman
of the Board

*†•‡ **S.R. Hatcher,**
B.Sc., M.Sc., Ph.D.,
P.Eng., F.C.I.C.,
Acting President and
Chief Executive Officer

*‡ **M.C. Burns,** B.A.
Executive Vice-President
BC Gas Inc.

•* **L.J. Celeste,** B.Sc., E.E.,
President and Chief
Executive Officer,
The New Brunswick
Telephone Co. Ltd.

*† **L.C. DeGroot,**
B.Sc.Mech., P.Eng.,
D.B.Adm.,
President
Bridgings
International Inc.

‡ **P.H. Harris,** Q.C.,
B.Adm., LL.B.,
Barrister & Solicitor
McCarthy Tétrault

† **Dr. K. Rao,** M.D.,
F.R.C.P.C.,
Partner
Associated Radiologists
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*‡ **I.S. Ross,**
P.Eng., C.Eng. (U.K.),
M.C.I.T.,
Consulting Engineer

* **J.L. Schlosser,**
C.M., LL.D.,
President
Tri-Jay Investments

† **D.R. Sellen,**
Q.C., B.A., LL.B.,
Partner,
Deeley, Fabbri, Sellen

J.J. Vacchino, M.El.,
President,
Vacchino Holdings Ltd.

* Executive Committee

† Audit Committee

* Committee on
Executive Management
and Compensation

‡ Corporate Marketing
Committee

Officers

Executive

S.R. Hatcher, B.Sc., M.Sc.,
Ph.D., P.Eng., F.C.I.C.,
Acting President and Chief
Executive Officer

D.G. Cuthbertson, C.A.
Corporate Vice-President,
Finance and Chief Financial
Officer

W.T. Hancox, B.Eng.,
M.Eng., Ph.D.,
Corporate Vice-President,
Technology and Planning

H.T. Hughes, B.Comm.,
Corporate Vice-President,
Human Resources

T.A. Wardrop, Q.C., B.A.,
General Counsel

E. Deslauriers, L.S.C., C.A.,
Treasurer

L. Carisse,
Acting Corporate Secretary

Operating

D.S. Lawson, B.Sc., P.Eng.,
President, AECL CANDU

T.E. Rummery, B.Sc.,
Ph.D., ndc, F.C.I.C., P.Eng.,
Acting President,
AECL Research

Thanks to an active employment equity program, AECL has made progress in recruiting talented individuals from the four designated groups – women, visible minorities, persons with disabilities and aboriginal persons.

Locations

AECL
344 Slater Street
Ottawa, Ontario
K1A 0S4

AECL CANDU
2251 Speakman Drive
Mississauga, Ontario
L5K 1B2

AECL CANDU
1155 Metcalfe Street
Montreal, Quebec
H3B 2V6

AECL Research
344 Slater Street
Ottawa, Ontario
K1A 0S4

AECL Research
Chalk River Laboratories
Chalk River, Ontario
K0J 1J0

AECL Research
Whiteshell Laboratories
Pinawa, Manitoba
R0E 1L0

AECL Research
Accelerator Business Unit
436-B Hazeldean Road
Kanata, Ontario
K2L 1T9

AECL Research
Local Energy Systems
15 Innovation Blvd.
Suite 209
Saskatoon, Saskatchewan
S7N 2X8

AECL Research
Low Level Waste
Management
67 John Street
Suite 104
Port Hope, Ontario
L1A 2Z5

AECL Research
SENSYS
36 Bentley Avenue
Nepean, Ontario
K2E 6T8

AECL Research
TUNDRA
840-7th Avenue S.W.
Suite 900
Calgary, Alberta
T2P 3G2

AECL Research
TUNDRA
5251 Office Park Drive
Suite 401
Bakersfield, California
93309

AECL Technologies
15400 Calhoun Drive
Suite 100
Rockville, Maryland
20855

Maritime Nuclear
527 King Street
Fredericton, New Brunswick
E2B 1E7

AECL
Glace Bay
Heavy Water Plant
P.O. Box 5
Glace Bay, Nova Scotia
B1A 5V8

AECL
LaPrade
Heavy Water Plant
4160 Becancour Blvd.
P.O. Box 700
Gentilly, Quebec
G0X 1G0

AECL
Port Hawkesbury
Heavy Water Plant
P.O. Box 698
Port Hawkesbury,
Nova Scotia
B0E 2V0